



# Volunteer Lake Assessment Program Individual Lake Reports

## NORWAY POND, HANCOCK, NH

### MORPHOMETRIC DATA

Watershed Area (Ac.):	4,546	Max. Depth (m):	5.5	Flushing Rate (yr <sup>-1</sup> )	19.2	Year	Trophic class	KNOWN EXOTIC SPECIES
Surface Area (Ac.):	49	Mean Depth (m):	2.5	P Retention Coef:	0.36	1980	MESOTROPHIC	
Shore Length (m):	1,900	Volume (m <sup>3</sup> ):	509,000	Elevation (ft):	825	1995	MESOTROPHIC	

The Waterbody Report Card tables are generated from the DRAFT 2014 305(b) report on the status of N.H. waters, and are based on data collected from 2004-2013. Detailed waterbody assessment and report card information can be found at [www.des.nh.gov/organizations/divisions/water/wmb/swqa/index.htm](http://www.des.nh.gov/organizations/divisions/water/wmb/swqa/index.htm)

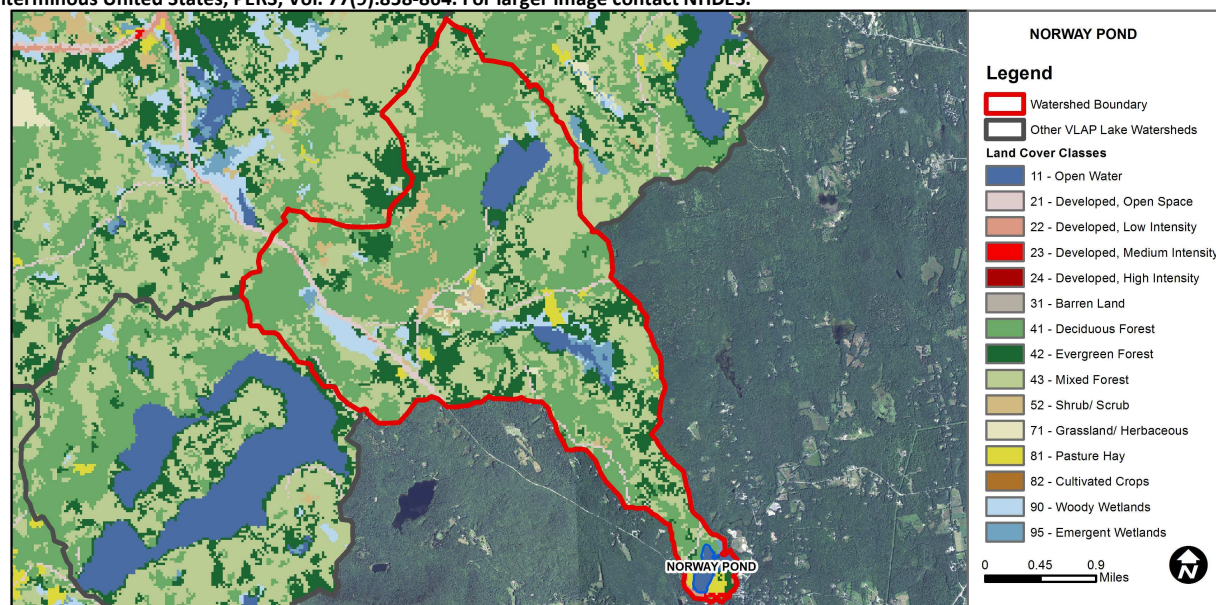
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Good	The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator and the chlorophyll a indicator is okay.
	pH	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	Oxygen, Dissolved	Encouraging	There are < 10 samples with 0 exceedances of criteria. More data needed.
	Dissolved oxygen saturation	Cautionary	There are < 10 samples with 1 exceedance of criteria. More data needed.
	Chlorophyll-a	Good	The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator.
Primary Contact Recreation	Escherichia coli	Very Good	Where there are no geometric means, all bacteria samples are < 75% of the geometric mean. Where there are geometric means all single bacteria samples are < the SSMC and all geometric means are < geometric mean criteria.
	Chlorophyll-a	Good	There are at least 10 samples with one, but < 10% of samples, exceeding indicator.

### BEACH PRIMARY CONTACT ASSESSMENT STATUS

NORWAY POND - TOWN BEACH	Escherichia coli	Good	There are geometric means and all geometric means are < geometric mean criteria; and there has been a single sample exceedance.
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### WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.



Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	4.45	Barren Land	0.09	Grassland/Herbaceous	0.57
Developed-Open Space	2.64	Deciduous Forest	41.28	Pasture Hay	1.25
Developed-Low Intensity	0.24	Evergreen Forest	14.54	Cultivated Crops	0
Developed-Medium Intensity	0.11	Mixed Forest	28.54	Woody Wetlands	2.65
Developed-High Intensity	0	Shrub-Scrub	2.55	Emergent Wetlands	1.05



# VOLUNTEER LAKE ASSESSMENT PROGRAM INDIVIDUAL LAKE REPORTS

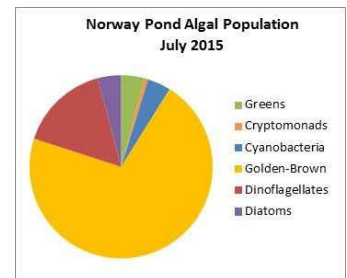
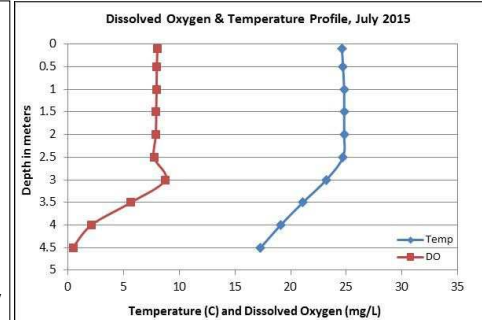
## NORWAY POND, HANCOCK

### 2015 DATA SUMMARY

**RECOMMENDED ACTIONS:** Moose Brook phosphorus, E. coli and turbidity were again elevated following a significant storm event of greater than 1.0 inch of rainfall. This station has a history of elevated and fluctuating levels, particularly after large volume storm events. The sub-watershed is relatively undeveloped suggesting a natural source, potentially a beaver dam that is washed out after heavy rains. However, a site walk should be conducted if human or agricultural sources are suspected and the town Health Officer should be contacted. Chlorophyll levels continue to be elevated periodically and a cyanobacteria (blue-green algae) bloom was noted in August. High water levels were again noted in June and August. If water was not being flushed at a normal rate from the pond, this may have provided excess nutrients for algae to grow. If possible, try to maintain a normal water level throughout the summer as the increased frequency and intensity of storm events may cause the water level to rise sharply and recede slowly. Agricultural and athletic fields may also be contributing nutrients. Educate landowner's on utilizing phosphate free fertilizers. Keep up the great work!

#### OBSERVATIONS (Refer to Table 1 and Historical Deep Spot Data Graphics)

- **CHLOROPHYLL-A:** Chlorophyll levels were slightly elevated in June, decreased to moderate levels in July and then decreased to low levels in August. However it was noted that a cyanobacteria bloom occurred in August. The 2015 average chlorophyll level decreased slightly from 2014 and was slightly greater than the state median. Historical trend analysis indicates relatively stable chlorophyll with moderate variability between years.
- **CONDUCTIVITY/CHLORIDE:** Deep spot, Moose Brook and Outlet conductivity levels were average and approximately equal to the state median. Historical trend analysis indicate significantly increasing (worsening) epilimnetic (upper water layer) conductivity since 2006.
- **E. COLI:** Moose Brook E. coli levels were elevated in August following a significant storm event and were much greater than the state standard of 406 cts/100 mL. Outlet E. coli levels were elevated, although not above the state standard, in June and August.
- **TOTAL PHOSPHORUS:** Epilimnetic and Hypolimnetic (lower water layer) phosphorus levels were higher in June when algal growth was elevated, however remained at an average level and then decreased to lower levels in July and August. Average epilimnetic phosphorus remained stable with 2014 and was less than the state median. Historical trend analysis indicates stable epilimnetic phosphorus since 2006. Moose Brook phosphorus levels were low in June and July and greatly elevated in August following a significant storm event. Outlet phosphorus levels were average in June and July and also elevated in August.
- **TRANSPARENCY:** Transparency was lower in June and July when algal growth was higher and then increase (improved) in August despite the cyanobacteria bloom. Average transparency improved from 2014 and was better than the state median. Historical trend analysis indicates stable transparency since 2006. Transparency measured with the viewscope (VS) was much better than non-viewscope transparency (NVS) in August.
- **TURBIDITY:** Epilimnetic and Hypolimnetic turbidities were within a low to average range for those stations. Moose Brook turbidity was elevated in August following a significant storm event and the Outlet turbidity was also slightly elevated.
- **pH:** Epilimnetic pH was within the desirable range 6.5-8.0 units however has historically fluctuated below the desirable range. Historical trend analysis indicates significantly increasing (improving) epilimnetic pH since monitoring began and we hope to see this continue! Hypolimnetic and Outlet pH levels were less than desirable and slightly acidic.



Station Name	Table 1. 2015 Average Water Quality Data for NORWAY POND							
	Alk. mg/l	Chlor-a ug/l	Cond. uS/cm	E. Coli #/100ml	Total P ug/l	Trans. m	Turb. ntu	pH
						NVS	VS	
Epilimnion	4.8	4.84	47.3		9	3.70	4.18	6.70
Hypolimnion			47.5		10			6.11
Moose Brook			39.6	683	38			6.56
Outlet			53.3	220	23			6.07

**NH Median Values:** Median values for specific parameters generated from historic lake monitoring data.

**Alkalinity:** 4.9 mg/L

**Chlorophyll-a:** 4.58 mg/m<sup>3</sup>

**Conductivity:** 40.0 uS/cm

**Chloride:** 4 mg/L

**Total Phosphorus:** 12 ug/L

**Transparency:** 3.2 m

**pH:** 6.6

**NH Water Quality Standards:** Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.

**Chloride:** > 230 mg/L (chronic)

**E. coli:** > 88 cts/100 mL – public beach

**E. coli:** > 406 cts/100 mL – surface waters

**Turbidity:** > 10 NTU above natural level

**pH:** between 6.5-8.0 (unless naturally occurring)

#### HISTORICAL WATER QUALITY TREND ANALYSIS

Parameter	Trend	Explanation	Parameter	Trend	Explanation
Conductivity	Worsening	Data significantly increasing.	Chlorophyll-a	Stable	Trend not significant; data moderately variable.
pH (epilimnion)	Improving	Data significantly increasing.	Transparency	Stable	Trend not significant; data show low variability.
			Phosphorus (epilimnion)	Stable	Trend not significant; data show low variability.

